



Crosswalk Policy Guide

An ITE Informational Report

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Crosswalk Policy Guide

An Informational Report of the Institute of Transportation Engineers

Prepared by the Pedestrian and Bicycle Standing Committee

The Institute of Transportation Engineers (ITE) is an international membership association of transportation professionals who work to improve mobility and safety for all transportation system users and help build smart and livable communities. Through its products and services, ITE promotes professional development and career advancement for its members, supports and encourages education, identifies necessary research, develops technical resources including standards and recommended practices, develops public awareness programs, and serves as a conduit for the exchange of professional information.

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A project committee of the ITE Pedestrian and Bicycle Standing Committee was established with the objective of examining best practices for developing crosswalk policies and assembling an informational report.

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Cover images: Top image: Trail crossing in Coopersburg Borough, Lehigh County, PA. Source: Patrick Wright Bottom image: Pedestrian crossing Portland Avenue S (Hennepin County Road 35) at Bischoff Lane using an overhead rectangular rapid flashing beacon in Bloomington, MN. Source: Kristin Petersen/Short Elliott Hendrickson, Inc.

A connected, safe, and comfortable transportation network for people walking, bicycling, and using assistive devices is necessary to provide an equitable transportation system for all people, regardless of age, ability, race, income, or mode of travel. Walking and bicycling are sustainable forms of transportation that provide healthy, affordable, and enjoyable options for daily travel.

The safety, accessibility, and mobility of pedestrians are at the core of why agencies seek to create a crosswalk policy. The intent of this document is to provide guidance to agencies for the development of crosswalk policies. It seeks to improve consistency in crosswalk policy development with the goal of improving the safety and accessibility for some of our transportation system's most vulnerable users. This guide provides practitioners with a consolidated resource for use in the development of crosswalk policies. It includes a comprehensive overview of information and direction to primary source material and will allow each agency to create a tailored crosswalk policy for its own jurisdiction.

This Crosswalk Policy Guide includes steps and processes

necessary for an agency to develop a crosswalk policy. This includes items such as the following:

- Appropriate stakeholders to engage
- Elements needed for a policy
- Inventory of existing facilities
- Identification of candidate locations
- Liability considerations
- Design guidance
- Information regarding the treatment selection process
- Implementation and phasing considerations

This guide does not include recommended best practices for treatment selection. However, the guide provides direction to resources and research on selecting context-appropriate treatments.



What is a Marked Crosswalk?

A **marked crosswalk** is a traffic control device involving markings and may be supplemented by signs, signals, and other enhancements.

Crosswalks are a critical part of our transportation system and provide the following to the traveling public:

Safety

Crossing a street as a pedestrian is often inherently challenging. Pedestrians' ability to detect safe gaps in motor vehicle traffic and negotiate the safe crossing of streets vary widely. Additionally, many roadways were not designed to prioritize pedestrian crossings. Crosswalk markings, along with other traffic control devices and physical improvements, can enhance the visibility of the crossing location to approaching road users, manage driver expectations about where pedestrians are likely to cross, control approaching traffic to create gaps for pedestrians, and help a community achieve safety goals such as Vision Zero. Crosswalks also provide definition to and reinforce the legitimacy of pedestrians at crossing locations.

Connectivity

Crosswalks are the links that connect sidewalks, trails, and paths across roadways to create a transportation network for pedestrians. Roadways can be barriers to pedestrians. A system of crosswalks defines where people may cross and where drivers and other road users should expect pedestrians.

Accessibility

Properly designed and constructed crosswalks provide access to all pedestrians, regardless of age or ability. Accessible design and understanding of the community's population and land uses will promote equity for all users of the transportation system, specifically those users with mobility impairments, and those who do not have other methods of travel and depend on walking and public transit.

Why Create a Crosswalk Policy?

Crossings are an integral part of the transportation system for pedestrians and bicyclists, who also represent the most vulnerable users of our transportation networks. Policies that

promote a systematic approach to crosswalk and network safety, connectivity, and accessibility are critical to protecting all roadway users.

AAA Foundation for Traffic Safety Research Brief on Examining the Increase in Pedestrian Fatalities in the United States, 2009-2018



This research brief highlights some of the statistics on pedestrian fatalities which may be important to cite for local agencies considering adopting a crosswalk policy.

The brief can be found at: <https://aaafoundation.org/examining-the-increase-in-pedestrian-fatalities-in-the-united-states-2009-2018/>

In the United States, from 2009 to 2019, annual pedestrian fatalities increased by 49 percent. (4,700 to 7,050) while total traffic fatalities decreased by 0.8 percent. Pedestrian fatalities as a percentage of total traffic fatalities are up from 12 percent to 17 percent.¹

It is critical to create safe midblock crossings, as 75 percent of pedestrian fatalities and 58 percent of bicyclist fatalities occur at non-intersection locations. Furthermore, research has demonstrated consistent underreporting of crashes involving pedestrians and bicyclists, with varied estimates suggesting that in some studies more than 50 percent of pedestrian and bicycle crashes may be missing from police reported crash data.

The following three key factors appear to play significant roles in pedestrian fatalities:

- Reduced visibility of crossings in evening hours due to darkness or lack of street lighting
- Crossings at non-intersection locations without a marked crosswalk
- Speeds and geometry on collector and arterial roadways

Nighttime darkness or lack of street lighting at night can both be factors in pedestrian fatalities due to lack of visibility. In

2019, 47 percent of fatalities occurred between the hours of 9 p.m. and 6 a.m. An overwhelming majority of pedestrian fatalities occur on collectors and arterials. In 2019, 63 percent of all pedestrian fatalities occurred on arterials and collectors.

Crosswalks and related treatments should be viewed as critical element of the transportation system – providing safe passage across a barrier – not that dissimilar from a bridge over a river. As such, the integration of crosswalks into the transportation network should be a priority consideration within a community and include the appropriate assessments and analysis to provide safe options where appropriate for pedestrians to travel across barriers within the community.

Crosswalk policies establish guidance for the consistent application and treatment of crossings throughout a community. To be effective and promote safety, marked crosswalks must be installed after careful consideration and review. The review shall be done with adherence to accepted guidelines and good engineering practice. There may be additional reasons to create a crosswalk policy which should be explored in each jurisdiction. There is no replacement for careful consideration of local plans, policies, and community values. This guide is only intended to support and advance these important considerations.

¹ Pedestrian Traffic Fatalities by State. Preliminary 2019 Data. February 2020.

When developing a crosswalk policy, one must consider the desired outcomes or goals of the policy. Crosswalk policies should, at a minimum accomplish the following:

1. Identify **best practices** for treating crosswalks.
2. Establish a **consistent context sensitive approach** to applying best practices.
3. Create a **project prioritization framework** for implementation.

Using these three principles will help keep policy development on track, keep stakeholder discussions focused, and result in a practical policy that achieves the agency's crosswalk safety goals. This section provides a brief overview of these principles, each of which are explored in more detail throughout this guide.

Best Practices

There are many research and guidance documents available related to crosswalk treatments, as well as standards at the national and local levels. These include type of markings, location of markings, and various thresholds for when additional crosswalk enhancements are needed. Identifying the appropriate standards and guidance in a crosswalk policy will result in consistent application as discussed below. This can be as simple as defining which high-visibility crosswalk type is used (e.g., ladder versus continental) to more challenging issues such as estimating potential crosswalk demand based on adjacent land use. The policy can be a combination of references to external documents along with details specific to an agency.

Consistency and Uniformity

While standards exist, agencies are still given flexibility in the application of these standards through engineering judgement and community priorities. Often, because crosswalks have been installed over a long period of time—with treatments based on guidance that was current at the time and the specific transportation professional that happened to be involved in the project—an agency may have a broad range of crosswalk application treatments. A crosswalk policy should establish a consistent application of best practices for a given context throughout an agency's jurisdiction, providing a consistent user experience. This sets expectations for people walking, biking, and driving, and promotes confidence among the public that an appropriate treatment is in place.

Project Prioritization

An agency likely has many crosswalks that may require various levels of enhancement to be consistent with their crosswalk policy, as well as a backlog of community requests. Understanding the role equity plays in transportation is also important, as historically transportation infrastructure has not been evenly distributed across many communities nor do all populations have equal access to power and to transportation options. The policy should consider and establish a method for prioritizing the diverse needs of the individual community in a deliberate and equitable manner. Prioritization will focus available funding and establish a timeline for bringing crosswalks in line with current best practices. Since crosswalks play a key role in accessibility, prioritization may also include the need to meet U.S. Access Board requirements consistent with an Americans with Disabilities Act (ADA) transition plan.

Who to Engage in Development of a Crosswalk Policy

As with most initiatives and policies, a successful crosswalk policy will require a champion or small group of champions within a jurisdiction to initiate the effort and maintain the momentum necessary to keep a policy updated and useful for the community. The most successful plans and policies are those that are formally adopted either as regulations or standards and are providing dedicated, ongoing funding within a community's budget. Institutionalizing the systems, maintenance, and improvement of crosswalks in a community should be a high priority.

A stakeholder group should be formed to help develop the initial policy and update the policy periodically. The stakeholder group should remain engaged and discuss improvements that were implemented as a result of the policy. Depending on the capacity and time constraints of the local agency that holds ultimate responsibility for the physical crosswalks in a community certain members of the stakeholder group may be needed to assist in policy implementation as well.

The size and makeup of the stakeholder group can vary greatly depending on individual communities but should include representation from as many perspectives as reasonable. Any group should be representative of the demographics and opinions of the community, and traditionally underserved populations must be intentionally given a voice. Potential stakeholder group members may include various combinations of primary, supporting, and public stakeholders depending on specific community structure, assets, and needs.

Primary Stakeholders

Primary stakeholder groups typically involve appointed, elected, or employed officials whose position or expertise leads them to have a significant role in crosswalk decisions, such as the following:

Transportation Department or Public Works Department

Focus on planning, design, and/or maintenance of crosswalks and associated traffic control devices. Some communities have a dedicated Active Transportation Planner to lead this work. Representatives should be included from any state, county, and local agencies that have jurisdiction over the roadways in the community. If the community does not have a dedicated Traffic / Transportation Department, the Public Works Department often handles the planning and design of crosswalks.

Elected Officials

Adoption of a crosswalk policy must include support from elected officials. It is critical to engage council, board, and/or commission members in the process and at key milestones

such that they understand the need, guiding principles, and process and can represent it to the broader governing body.

Community Transportation Safety Committee Members

Many communities include some form of an elected official-appointed citizen safety committee and safety committee members' participation can provide a link to both elected officials and the public.

Local School Districts

A district facility, transportation, and/or safety representative can provide school walking routes and priority information to be used to inform the school crossing portion of the policy.

Local Transit Agency

A representative from the local transit agency can provide ridership information and perspectives to help prioritize crosswalk improvements near transit stops and share observations of bus operators.

Local Ped/Bike Advocacy Groups

Advocacy groups provide direct user perspectives, can often offer insights on best practices, and can help to identify high-risk locations. Advocacy groups can also be used in pedestrian/bicycle safety education and to facilitate public outreach efforts.



Figure 1. Example of crosswalk enforcement sign in Mt. Angel, OR, USA. Source: Mt. Angel Police Department.

Law Enforcement

The involvement of state, county, and/or local law enforcement provides insight on enforcement needs and challenges, including observations and/or data on driver compliance and general performance of various crosswalk treatments. Law enforcement often works closely with local school districts to provide crossing guards or enforcement at school crossings or major events. Law enforcement can also be used in pedestrian/bicycle safety education and training of children and drivers.

Supporting Stakeholders

The following represent community departments or groups that can provide valuable input to the primary stakeholder group:

Agency Administration

Support from an agency's administrative or finance group can help provide information on opportunities for crosswalk improvements to be included in dedicated or larger infrastructure funding programs.

Risk Management / Legal Department

To make the policy as defensible in legal cases as possible, consultation with the agency's legal and/or risk management department should be included in the overall development of the policy. These individuals can also effectively communicate with elected officials and members of the public on the importance of having a good crosswalk policy (if needed) and explain why agencies must meet or exceed requirements of the Manual on Uniform Traffic Control Devices (MUTCD).

Community Planning/Development Department

A representative from a community planning department can provide valuable perspectives from local neighborhood or community groups on issues or concerns and can help provide prioritization information for the policy. This representative can also provide support in land use development review, which affects pedestrian facilities.

Parks / Recreation Department

In conjunction with a community's sidewalk system, a representative from a parks and recreation department can provide a perspective on trails and multi-use path systems and crosswalk needs to accommodate users of these systems.

Local Metropolitan Planning Organization (MPO) / Regional Planning Agency (RPA) / Council of Governments (COG)

Local and regional planning agencies can help identify state and federal funding opportunities that can help implement safety improvements.

Public Health Agency

Numerous public health agencies have focused programs and staff to work with their communities to be more walkable and bikeable. Additionally, these agencies can provide injury data that may not otherwise be available through crash reports.

Public Stakeholders

To obtain proper input and support from the public, it is important to engage the broader community. The process of policy development should be based on local conditions such as community engagement directives, redevelopment, or recent and recurring safety concerns. As users of the system, the public has unique insights that should be considered in policy development; insights that other stakeholders may not have. Public engagement should be done in a way that captures the diverse perspectives of the community. Traditionally underserved populations must intentionally be given a voice. Some ways to engage the public include the following:

Community Centers/Farmers Markets/Fairs

Community centers, farmers markets, and fairs are a way to reach the general public at events they may already be participating in. Consider setting up a table to educate, talk about, and engage members of the public about crosswalks.

Churches and Religious Institutions

Churches are a place of gathering for many people on a regular basis. Consider engaging in outreach to churches and religious gathering places when seeking public input on crosswalk policies.

Schools

Schools offer an opportunity to engage in outreach to youth stakeholders on crosswalks. This outreach may include education on crosswalk safety for children as well. Federal (U.S.) Safe Routes to School and Transportation Alternatives funding sometimes require outreach at schools when school crossing improvements are funded.

Advocacy Organizations and Special Interest Groups

Advocacy and special interest stakeholders are important to involve in crosswalk policy decisions. Individuals in this category may include safety advocates, groups representing underserved populations, organizations for persons with disabilities, local business organizations, and maybe even groups hosting major events.

Engagement should be welcomed and inclusive of the communities being served. As public engagement is contemplated, any policy should reflect on equitable consideration of the public input. Input should not solely reflect those with the loudest voices or those who seek to engage the process but should also reflect the needs of the community as a whole. This may include opportunities and impacts to various groups who may not be well-represented in public hearings or other more traditional public involvement processes.

In conjunction with the public agency department in charge of implementation, the stakeholder groups should work together to develop the initial policy. Although no two policies will be the same, the checklist below provides the minimum sections that are helpful to include in any crosswalk policy. The latter portion of this section explains what may be included in each section of any agency's crosswalk policy.

Sample Crosswalk Policy Table of Contents Checklist

- ✔ Road Authority/Agency Coordination/Elected Official/Agency Administration Support
- ✔ National and Local Statutes
- ✔ Crosswalk and Crash History
- ✔ Crosswalk Inventory
- ✔ Crosswalk Location Review Process
- ✔ School Crossings
- ✔ Crosswalk Treatment Selection
- ✔ Implementation/Phasing/Prioritization
- ✔ Maintenance

Road Authority / Agency Coordination / Elected Official / Agency Administration Support

The support structure is clearly defined and documented for the maintenance, modification, and implementation of existing and new crosswalks in the community. In many communities, there may be joint authority situations, and the crosswalk policy needs to refer to any agreements or documentation to describe these relationships.

National and Local Statutes

Current national and local statutes regarding the formal definitions of what constitutes various crosswalk facilities as well as the laws and expectations of motorists and pedestrians at crosswalks are clearly defined. The crosswalk policy will need to be updated to include any changes to those statutes over time.

National and local laws and ordinances also may address crosswalk and pedestrian crossing legal definitions. These rules, codes, and laws also must be considered in the crosswalk policy.

For example, in the United States the MUTCD provides federal standards, guidance, and options on crosswalk marking. The U.S. Access Board's ADA Accessibility Standards are federal requirements for accessibility. These requirements must be included in the crosswalk policy. The Public Right of Way Accessibility Guidelines (PROWAG) reference additional best practices for crosswalk design.

Crosswalk Data and Crash History

Agencies should consider local information on key statistics, pedestrian use data, pedestrian facility inventories, crash history, and contributing factors (such as vehicle speed) to inform crosswalk safety decisions. Agencies should highlight connection to other safety programs, including Vision Zero and Toward Zero Deaths. It is important to discuss interagency collaboration to improve crosswalk safety, such as that among transportation, police, and fire departments. This section may also include goals for reducing crosswalk-related serious injury and fatal crashes. It should also establish a basis for the system of crosswalks in the community, integrating crosswalk placement in relation to adjacent land use.

Crosswalk Inventory

Documentation of existing crosswalks is included for a community to understand current conditions and issues that need to be addressed. The existing inventory also identifies any missing documentation necessary to meet MUTCD requirements. Each crosswalk should be documented, like similar systems used for bridges and pavement.

Crosswalk Location Review Process

The confirmation of existing crosswalk locations and identification of new crosswalks will be accomplished through proactive initiatives as well as reactive actions to known concerns and community requests. Updates to desirable crosswalk locations will be determined as the community's land use and associated walk routes change over time.

School Crossings

If there are schools within the community, criteria specific to school crossings are developed in conjunction with the local jurisdiction, school district, and law enforcement agency. Traffic control device requirements, crossing guard placement and operations, and special traffic enforcement strategies are defined and documented.

Crosswalk Treatment Selection

Crosswalk pavement markings, signs, signals, and street designs should be consistent with design standards. In the United States, these are provided in the MUTCD, AASHTO's *A Policy on Geometric Design of Highways and Streets* (The Green Book), and the NACTO *Urban Street Design Guide*. In some states and local jurisdictions, specific criteria are developed. They consider several parameters including (but not limited to) traffic volumes, pedestrian crossing frequency, crossing volumes (current and anticipated), gaps in traffic, vehicle speed, crossing width, sight distance, primary users of the crossing, access, and other criteria related to the specific situation being considered.



Figure 2. Example of inadequate and poorly maintained drainage blocking crosswalk.
Source: Dan Burden/PBIC.

Implementation / Phasing / Prioritization

The crosswalk implementation program is developed considering a combination of the community's priorities for pedestrian risk and exposure, need to provide equitable access to transit service, various land uses across a community, regional and local Complete Streets and safety plans, and plans for street improvements or replacements. This section may include important information and goals about protecting vulnerable populations, such as communities of color, lower income individuals, people with disabilities, youth and/or elderly persons, and using crosswalk policies to ensure equitable transportation prioritization.

Maintenance

Ongoing crosswalk maintenance costs for the pavement, pavement markings, signage, and other enhancement equipment will be developed for inclusion in the community's operating and/or capital improvement budgets. This is an increasingly important aspect of a crosswalk policy with the emergence of connected and automated vehicles which may depend on uniform and reliable traffic control devices. Costs may include both in-house and contracted maintenance, and will include considerations such as staff time, equipment and vehicles, temporary traffic control, and material costs. This section should also include a policy regarding crosswalks affected by construction activity.

A key element of a crosswalk policy is a plan for inventorying existing marked crosswalks throughout the jurisdiction. Inadequate or missing crosswalks can cause potential safety issues, so inventories are an important consideration in crosswalk policies. Crosswalks, when used, should be documented on a shared file or map so all departments in an agency know the location and specific crosswalk details

Even when inventories exist, they often lack all the information required to evaluate the adequacy of pedestrian crossings sufficiently and systematically. The inventory sets the baseline by providing an understanding of what facilities are, and are not, in compliance with the policy. Much of this inventory may be included in other documents such as a Vision Zero Plan, Roadway Safety Plan, or Safe Routes to School Plan.

Inventory of Existing Facilities Checklist

- ☑ Pedestrian volume and pedestrian types
- ☑ Controlled or Uncontrolled (Intersection or Mid-Block)
- ☑ Control type
 - Stop, Yield, Traffic Signal, No Control
- ☑ Crosswalk marking type
 - Material
 - Crosswalk style
 - Advance limit lines
 - Condition of marking
 - Advanced pavement markings
- ☑ Crosswalk signs
 - Advanced warning signs
 - Type of crossing sign (pedestrian, school, trail, combined with bike)
 - In-roadway signs
 - Condition of signs
- ☑ Crosswalk beacons
 - Steady flashing, Rectangular Rapid Flashing Beacon (RRFB), Pedestrian Hybrid Beacon (PHB)
 - Position (at crossing, advanced, overhead)
- ☑ Pedestrian activation features
- ☑ Vehicle lane configuration
- ☑ Vehicle speed (posted and operating) and vehicle volume
- ☑ Conflicting vehicle movements (intersections, driveways)
- ☑ Traffic signal phasing (including protected/ permissive turns across crosswalk)
- ☑ Intersection geometry
 - Crossing distance
 - Corner radii
 - Median
- ☑ Sight distance
 - No parking signs and markings
 - Vegetation
 - Horizontal and vertical curves
- ☑ ADA compliance
- ☑ Lighting

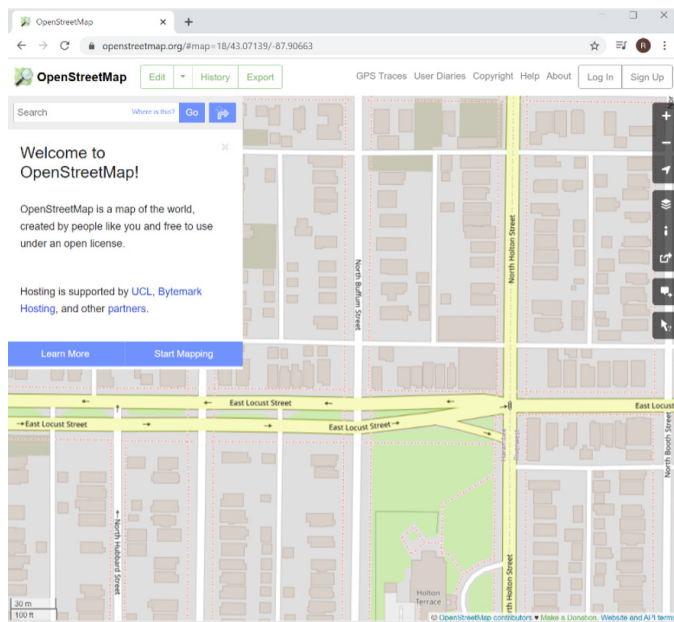


Figure 3. Example of open street data from OpenStreetMap that can be used for data collection.

Source: OpenStreetMap.

Methods for Developing and Updating Inventories

There are a variety of ways to collect crosswalk data, ranging from traditional manual methods to automated computer vision technologies. Inventories should be maintained in a Geographic Information System (GIS) database for ease of processing and analysis. This will also simplify the process of overlaying other available contextual data such as land use the agency may already have. Incorporating a GIS database can be an important tool for systemic safety analysis of crosswalks as well (see Identifying Candidate Locations).

Available data from Web sources (such as Google Street View or Walkscore.com) can provide ready sources of information in some communities quickly. Open-source data such as that available from openstreetmap.org (Figure 3) can also provide a starting point or additional layer of data for use in crosswalk evaluation.

Already available data can be supplemented in the following several ways:

- **Walking Audit** - staff and stakeholders travel to crossing sites and manually record data (this could be done using paper or an app).
- **User Generated Data** - members of the public submit data through a platform, such as seeclixfix.com or another smartphone app.
- **Video Analytics** - data providers use computer vision algorithms to quickly geocode baseline conditions for analysis of active transportation facilities such as sidewalks, crosswalks, bicycle lanes, and paths. The analysis can be completed using publicly available sources or video captured by agency staff and uploaded for processing.
- **Big Data** - data providers use connected vehicle, cell phone, and GPS data to identify hot spots of pedestrian activity.

A crosswalk policy should identify which of these data sources will be used and how frequently they will be updated. For example, the City of West Palm Beach, Florida does a city-wide light detection and ranging (LiDAR) scan every 4 years to refresh its inventory and is considering implementing video analytics on their garbage trucks because they regularly cover the City's roadway network.



Figure 4. Example of a situation that would not be reported as a crash but may still have potential for safety improvements. *Source: Fehr & Peers*

Crash Data

Pedestrian crash data (including location, time of day, crash factors, information about pedestrian and driver actions, crash-involved party demographics) are collected when a law enforcement officer responds to a motor vehicle crash, typically involving injury. This crash report data should be requested by the agency and geocoded as a layer within the GIS database. Crash report data can be used to identify “hotspot” locations and along with the contextual data above, to identify crash typologies that can be addressed systematically throughout an agency’s jurisdiction. This data should be updated as crash reports are finalized.

In addition to reviewing crash data, newer technologies are allowing for the collection of near-data that can be used to identify potential crash sites before a crash occurs. This can be used to supplement the crash data to proactively identify locations that may not currently be collision hot spots.

Identifying Candidate Locations

Potential candidate locations include existing marked crosswalks, unmarked crossings, and midblock locations. They also include locations where pedestrian crossings may have been prohibited in the past (e.g., at a traffic signal to improve

vehicle operations). Both proactive and reactive approaches for identifying candidate locations are needed to develop a comprehensive pedestrian crosswalk safety strategy.

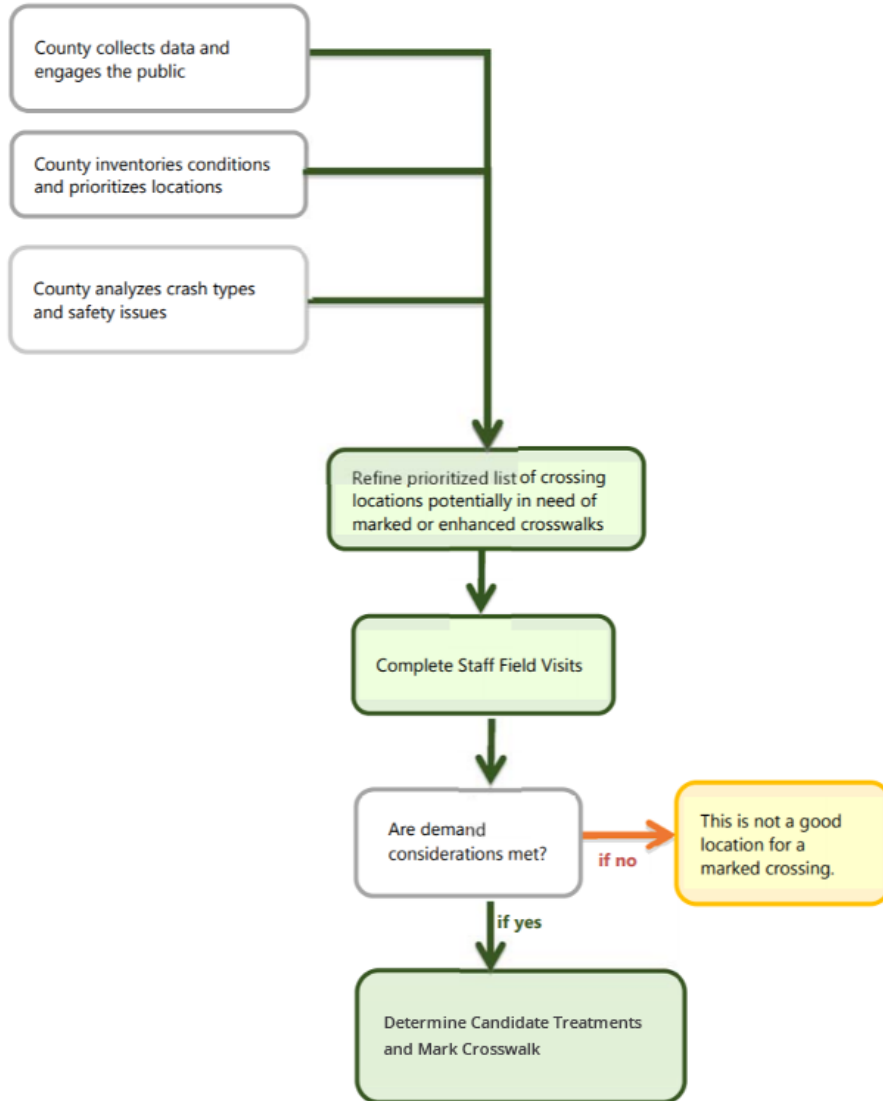


Figure 5. Example Proactive Process for Determining Whether to Mark Uncontrolled and Midblock Crosswalks, Alameda County Crosswalk Policy. Source: Fehr & Peers.

Proactive Approach

Proactive strategies help identify potential locations for marking new crosswalks and prioritize enhancements to existing crosswalks by utilizing a holistic and comprehensive approach to pedestrian safety. Proactive approaches help transportation professionals recognize that the absence of crashes does not signify the presence of safety. In some locations—often found in less populated jurisdictions or

areas with lower pedestrian activity—crashes may be sparse. Yet, these locations may possess similar characteristics to sites where crashes have accumulated. For example, “risky” sites may have multiple travel lanes, poor sight distances at intersections, skewed angle intersections, high vehicle operating speeds, etc. By using contextual information, risky locations can be prioritized and enhanced before a crash occurs.

A proactive approach includes assessing community factors such as lighting, crossing frequency, vehicle operating speed, driveway frequency, transit access, sidewalk gaps, long road crossing widths, security perceptions, and land use desire lines and paths between pedestrian generators such as schools, community centers, commercial centers, trails, and residential areas (particularly higher density). It also requires identification of planned, proposed, and approved land use developments in the area that change pedestrian circulation patterns. A common factor in review of pedestrian crossing needs is the spacing of safe crossings across large roadway corridors. When crossing spacing becomes long, pedestrians may choose to cross midblock between marked crossings. Crossing outside of marked crosswalks can result in depressed count data and an underestimation of the number and frequency of people crossing a facility. This is one reason why placing secure crossings at locations where pedestrians are likely to cross is critical. Observational studies, focus groups, and interviews with community members—with particular attention to people who lack personal access to motor vehicles, use the transit system or walk to work or school—can guide agencies in determining where to proactively place secure crossings.

Reactive Approach

Reactive approaches are also useful tools to improve safety at crosswalks. By analyzing crash data and addressing community requests, these techniques ensure that crossings with documented safety issues are addressed. However, the process for how the jurisdiction reacts needs to be clear, transparent, and data-informed. The processing of a request to mark a crosswalk should be outlined and include the moment staff receives the request to its satisfactory conclusion. This process should always include a staff field visit to understand the site and its engineering constraints. If a decision is made to mark the crosswalk, it should be done so with the appropriate treatment for the given context.

Development of a transparent, straightforward crosswalk request process helps organize multiple requests from residents, elected officials, and other stakeholders. These requests should be geocoded in a system for ready retrieval. Developing clear expectations from the beginning can provide requestors information on timelines for a response, how their request will be evaluated with some of the previously discussed processes, and how limited budgets can also be a factor in decision-making.

When to Mark a Crosswalk

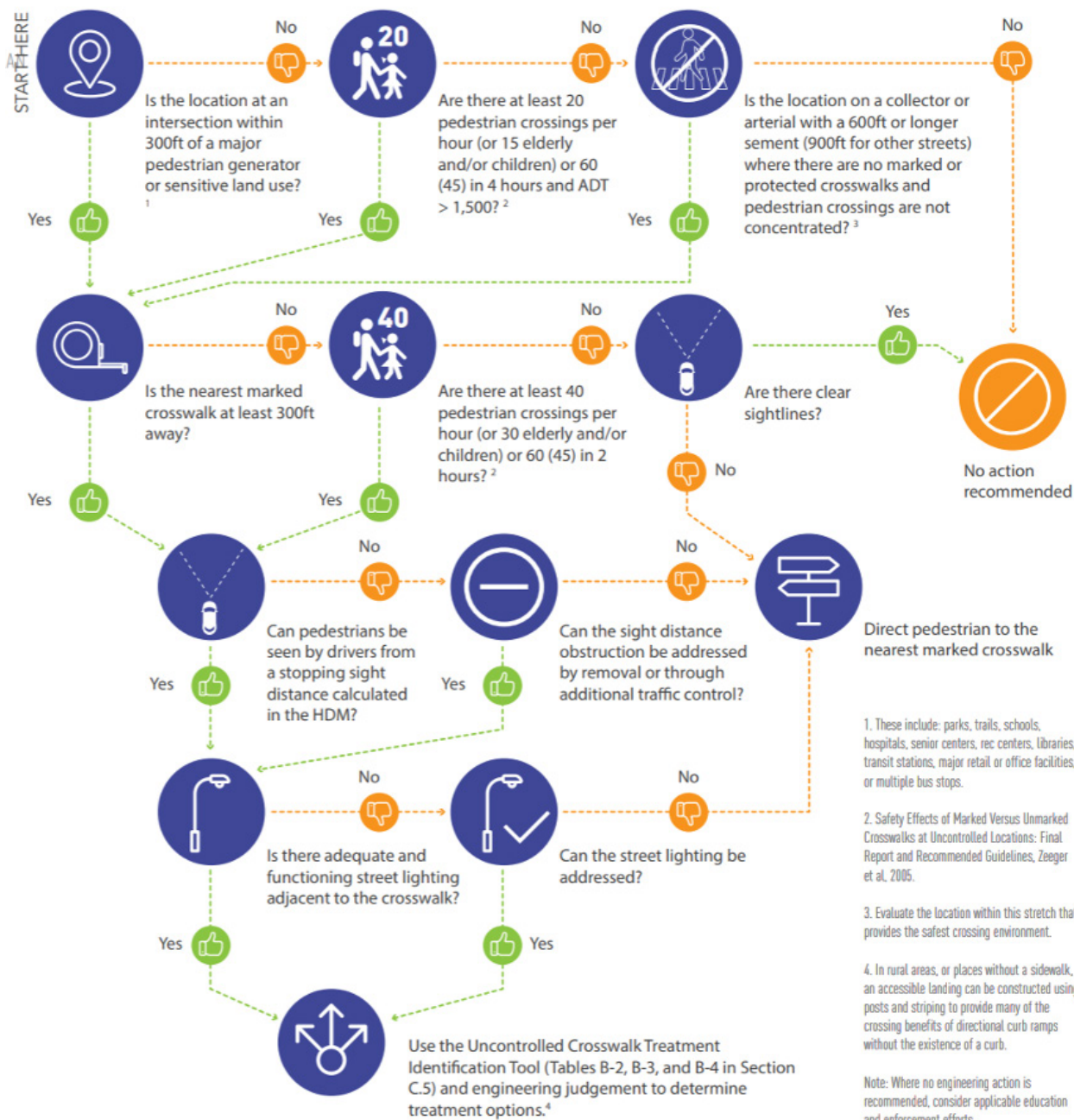


Figure 6. Example decision flow chart for marking crosswalks at uncontrolled locations, City of Pittsburg, California Crosswalk Policy. Source: Fehr & Peers.

Identifying candidate locations for marked crosswalks involves the following two steps:

- 1. Identify where people would like to cross the street:**

These locations are called pedestrian desire lines, which represent the most desirable, and typically most direct, locations where people want to cross a street. Pedestrian desire lines are influenced by elements of the roadway network like transit stops, as well as nearby land uses. Information about these elements of the roadway

network help identify areas where pedestrian crossings may need to be improved. Considering these demand desire lines (including origin and destination source) will help identify locations that may have low existing demand because of lack of safe crossing facilities but that would see increased pedestrian demand (expressions of latent demand) with improved crossing treatments. Specific crossings needing enhancement can then be identified through engineering studies, walk audits, agency staff observations, or public feedback.

2. Identify where people can cross safely: The primary consideration in this step is adequate stopping sight distance corresponding to vehicle speed and possible sight line obstructions. Pedestrians are at highest risk of injury in a crash because they are the least protected. There are numerous options for enhancing pedestrian safety at uncontrolled and controlled crossings, with treatment selection based on the overall context of the crosswalk, including placement of transit stops, surrounding land uses, roadway characteristics, and road user characteristics.

Some agencies have thresholds for pedestrian volumes required to implement crossing treatments. Local, state, and

federal thresholds and warrants should be reviewed when developing the crosswalk policy. It is important to consider the latent demand at potential crossing locations. People may not cross at a certain location because it feels unsafe; however, this does not mean that the threshold would not be met if the crosswalk and additional treatments are implemented. This can be tested by looking at adjacent land uses, trip generating potential, and potential desire lines.

Once candidate locations are identified, an engineering evaluation should be conducted to determine if a marked crosswalk should be installed, and if so, what visibility enhancements should be included in the design.

Some agencies spend significant portions of their budget for tort defense and awards or settlements in civil litigation related to pedestrian crossings. Traffic departments typically have some of the highest exposure to civil litigation because the roads are open to all roadway users. The overriding concern is the protection of roadway users and providing a safe walking environment based on sound engineering practices.

A proactive pedestrian safety program can identify challenging pedestrian safety issues and provide safe and appropriate accommodations based on sound engineering judgement and traffic studies. Those agencies that do not treat pedestrian safety systematically have the potential to contribute to more crashes and to be more exposed to liability. Features of a good pedestrian safety program to help minimize agency liability include the following:

- A proactive safety program that elevates pedestrian safety to be on par with vehicle safety in terms of policies, systems, and plans
- Data-informed criteria and priorities for marking new crosswalks and providing crossing enhancements in an equitable way
- Consideration of resident, police, or elected official complaints or concerns, along with prompt documentation
- Adequate training of staff in conducting traffic engineering studies, the application of the MUTCD and state supplements (where they exist), as well as state/local policies (including ADA considerations)
- Monitoring of the roadway system and pedestrian-related traffic control devices
- Documentation of traffic engineering studies, reasoning for using a crosswalk traffic control device(s) and actions taken (utilizing statements of fact rather than opinion)
- Follow-up studies or observations conducted when appropriate (or when recommended in work orders/studies or with areawide or corridors studies, land use development review, etc.)
- Use of appropriate traffic control devices that are context sensitive
- Traffic control device maintenance, including replacing traffic control devices (TCDs) that are worn, damaged, well past service life, or missing, or renovating/modifying devices that are no longer appropriate

There are a few excellent guidance documents available to assist in the design of crosswalks and pedestrian crossing treatments. In the United States for example, each state is required to adopt the MUTCD, adopt a state supplement, or create a state manual that substantially conforms with the MUTCD. The MUTCD contains standards, guidelines, and options for crosswalks, signs, traffic signals, pedestrian hybrid beacons, temporary, and other traffic control devices. In addition, the Federal Highway Administration (FHWA) MUTCD website provides interim approvals, official interpretations, and answers to frequently asked questions that may provide helpful information to the designer and pedestrian safety specialist. Detailed information on the MUTCD can be found at: https://mutcd.fhwa.dot.gov/htm/2009r1r2/html_index.htm.

Other important guidance documents include the *ITE Traffic Control Devices Handbook (TCDH)*, the *AASHTO Guide for the Planning, Design and Operation of Pedestrian Facilities*, the *NACTO Urban Street Design Guide*, the *FHWA Safe Transportation for Every Pedestrian (STEP) Guide*, the *Transportation Association of Canada's (TAC) Pedestrian Crossing Control Guide*, the *Pedestrian Safety Guide and Countermeasure Selection System (PEDSAFE)*, as well as several NCHRP and FHWA study reports to identify appropriate treatments and countermeasures to improve pedestrian safety and mobility, reduce motorist speeds, and enhance the quality of life. A listing and brief descriptions of some of the more relevant guides and reference materials are provided in Appendix A. This list offers resources to transportation professionals and others interested in improving crosswalk policy in their community.

Many agencies have translated this guidance into policy. Appendix B highlights case study example policies and plans that can be referenced for use by other public agencies.



The U.S. Access Board provides guidance on accessible design for streets and sidewalks in the Public Rights-of-Way.

The Access Board is an independent federal agency that promotes equality for people with disabilities through leadership in accessible design and the development of accessibility guidelines and standards.

Created in 1973 to ensure access to federally funded facilities, the Board is now a leading source of information on accessible design. The Board maintains design criteria and is developing new guidelines for Public Right-of-Way. "The Board's aim in developing these guidelines is to ensure that access for persons with disabilities is provided wherever a pedestrian way is newly built or altered, and that the same degree of convenience, connection, and safety afforded the public generally is available to pedestrians with disabilities."

To learn more, visit: <https://www.access-board.gov/guidelines-and-standards/streets-sidewalks/public-rights-of-way>.

Uncontrolled Crosswalk Treatment Selection Process

A key component of a crosswalk policy is setting a consistent method for marking and enhancing crosswalks. This section includes guidance as well as references, that can be incorporated into an agency's policy.

The decision to mark, sign, and add enhancements to pedestrian crosswalks requires consideration of context, characteristics, and users as these crossings can present an agency or owner with complex safety and risk management choices. A treatment selection process aims to clarify the order and judgement needed to make pedestrian crossing treatment decisions. By approaching these decisions systematically, the

risks associated with inconsistencies can be reduced resulting in greater pedestrian safety.

Data

The information a designer would need to make decisions regarding pedestrian traffic control devices and enhance treatments in most cases are readily available from Google Maps, agency plans and/or agency data sources. These data measures include the following:

Table 1. Example of Data Measures for Systemic Pedestrian Safety Analysis

Measure	Availability*	Areas for Heightened Risk
Vehicle Speed Limit	Field Review, Google Maps	>25 mph
Lanes	Field Review, Google Maps	Over two
Bus Routes	Field Review, Google Maps	Transit stops
Intersection Legs	Field Review, Google Maps	>3 legs
Lighting	Field Review, Google Maps	No Lighting
On-Street Parking	Field Review, Google Maps	Parking at or near crosswalk
Functional Class	Agency Plans	Collectors + Arterials
Vehicle Volume	Agency Plans/Agency Data	>10,000 vpd
Turning Vehicles	Counts (low availability)	Turns above 25 percent of approach
Vulnerable Users	Google Maps/Field Review Land Uses MPO/RPA/COG GIS	Young (e.g., schools), over 65, (e.g., senior housing), people with disabilities (e.g., service providers)

Source: *Systemic Pedestrian Safety Analysis, NCHRP Research Report 893, TRB, 2018, Table 3.*

*Note – Google Maps information can be dated. Where Google Maps is not current, other sources such as transportation plans, GIS, agency records or field observations should be reviewed.

What Types of Crashes Result in Pedestrian Fatalities?

The top three types of crashes and possible issues for pedestrian fatalities are noted in the following table.²

Table 2. Types of Crashes Resulting in Pedestrian Fatalities

Cause	Issue
Pedestrian failure to yield	Lack of available gaps, lack of crossings, nighttime judgement, darting
Turning vehicles	Primary driver focus is on oncoming vehicles over other conflicts
Motorist failure to yield	Speed, sight distance/visibility, driver culture

Note that while a crash may be marked as pedestrian failure to yield, this does not imply an assumption that the pedestrian was at fault. It may be an indication that there is a lack of crossing opportunities. The uniform marking, signing, and enhancing of pedestrian crossings that are not controlled by signals or stop signs can address each of these issues

by improving visibility of crossing areas, improving crossing situational awareness, and establishing appropriate crossing points. Situational awareness may include vehicle speed given presence of pedestrian crossings, yielding/stopping behavior, and pedestrian gap acceptance and judgement.

² Transportation Research Board. *Guidance to Improve Pedestrian and Bicycle Safety at Intersections*. NCHRP Research Report 926. Transportation Research Board, 2020. Tables 8, 9, and 10. Pages 30-31.



Figure 7. An example of a basic crosswalk marking across a stop-controlled approach, and a high-visibility crossing across an uncontrolled approach in Harrisburg, PA. Source: Patrick Wright, PennDOT LTAP.

The Decision Sequence

The following list highlights key questions that should be answered following the evaluation of data:

1. Should a crossing be marked?
2. What crosswalk markings should be used?
3. What signs should be used?
4. Do conditions call for enhancements?
5. When are greater levels of traffic control appropriate?

Should a Crossing be Marked?

Great care and thought should go into placement of a marked crosswalk. A crosswalk policy is a tool to ensure uniform crosswalk markings across a jurisdiction. There are reasons to mark crosswalks beyond safety (pedestrian network plans,

path/trail crossings, etc.). Studies should be undertaken to address and document the appropriate enhancements needed to install a new marked crosswalk across an uncontrolled approach.

What Crosswalk Markings Should be Used?

The crosswalk policy should identify the agency's preferred marking treatment for crosswalks. Basic crosswalk markings include two white stripes. Various enhanced striping treatments are available such as ladder or continental high visibility markings as well as advance stop or yield lines to improve the visibility of pedestrians. In the United States, some states have received approval for specific crosswalk markings within defined school zones (see inset). These standards and agency-specific school zone measures should be incorporated into a crosswalk policy as appropriate.



Figure 8. Image of yellow crosswalk markings in school zones required by California Vehicle Code in Imperial, CA Source: Fehr & Peers.

CALIFORNIA VEHICLE CODE 21368

“Whenever a marked pedestrian crosswalk has been established in a roadway contiguous to a school building or the grounds thereof, it shall be painted or marked in yellow as shall be all the marked pedestrian crosswalks at an intersection in case any one of the crosswalks is required to be marked in yellow. Other established marked pedestrian crosswalks may be painted or marked in yellow if either (a) the nearest point of the crosswalk is not more than 600 feet from a school building or the grounds thereof, or (b) the nearest point of the crosswalk is not more than 2,800 feet from a school building or the grounds thereof, there are no intervening crosswalks other than those contiguous to the school grounds, and it appears that the facts and circumstances require special painting or marking of the crosswalks for the protection and safety of persons attending the school. There shall be painted or marked in yellow on each side of the street in the lane or lanes leading to all yellow marked crosswalks the following words, “SLOW—SCHOOL XING,” except that such words shall not be painted or marked in any lane leading to a crosswalk at an intersection controlled by stop signs, traffic signals, or yield right-of-way signs. A crosswalk shall not be painted or marked yellow at any location other than as required or permitted in this section.”

To read more about the California Vehicle Code, visit: http://leginfo.legislature.ca.gov/faces/codes_displaySection.html?lawCode=VEH§ionNum=21368#:~:text=21368.,to%20be%20marked%20in%20yellow



Figure 9. Example of a portable R1-6 in Lemoyne, PA, USA. Source: Patrick Wright, PennDOT LTAP.

Should Signs be Used?

The MUTCD outlines seven pedestrian crossing sign types, and an agency's preferred use case for these signs can be documented in their crosswalk policy:

- Stop/Yield for Pedestrians sign (R1-5)
- In-road Stop/Yield for Pedestrians sign (R1-6)
- Overhead Pedestrian signs (R1-9)
- Turning Vehicle Yield to Pedestrians sign (R10-15)
- Pedestrian Crossing warning sign with downward arrows (W11-2, W16-7P)
- Advanced Pedestrian Crossing warning sign (W11-2)
- School zone crossing signs with downward arrows (S1-1, W16-7P)

Do Conditions Call for Enhancements?

For multi-lane crossings with daily vehicle volumes exceeding 10,000, a marked crosswalk alone is typically insufficient (Zegeer, 2005). Assessing proper enhancements should consider current best practices, including median island, vehicle lane reduction (road diet), beacons, curb extensions, advanced pavement markings, raised pedestrian crossings, street lighting, and/or traffic calming.



Figure 10. Example of multi-lane roadway with a median refuge in Bellevue, WA. Source: Dan Burden/PBIC.



Figure 11. Example of a Raised Crossing. Source: Fehr & Peers.



Figure 12. Example of Rectangular Rapid Flashing Beacons in Gettysburg, PA, USA.

Source: Patrick Wright, PennDOT LTAP.

When are Greater Levels of Traffic Control Appropriate?

There are cases where higher levels of traffic control may be needed in addition to markings and signs. The criteria for the use of these controls can be found in the MUTCD and/or state/local design supplements and may include vehicle speed, roadway type, availability of pedestrian gaps, and driver yielding behavior.



Figure 13. High-visibility crosswalk and advanced stop bar at a Signalized intersection in Chicago, IL.

Source: Ryan McClain.

Like uncontrolled crossings, consistency is also important at controlled pedestrian crossings, including yield, stop, and signalized locations. This section includes guidance, including references, that can be incorporated into an agency's policy. Consistent marking of crosswalks at controlled crossings, as is the case with uncontrolled, provides the same driver and pedestrian expectation benefits.

The Decision Sequence

The following list highlights key questions that should be answered following evaluation of data:

1. Should a crossing be marked?
2. What crosswalk markings should be used?
3. Are geometric enhancements needed?
4. What signal phasing is appropriate? (Signalized intersections only.)

Should A Crossing Be Marked?

Similar to uncontrolled crossings, the first decision is whether a crosswalk should be marked. For stop and yield controlled intersections, the decision to mark is often made based on the context (e.g., volume of traffic, number of lanes, proximity to schools, adjacent land uses). Many agencies won't mark these crosswalks in low volume, low speed residential neighborhoods but may mark all stop-controlled intersections in their downtown, for example. The crosswalk policy should provide the decision process so controlled crosswalks are marked consistently.

For signalized intersections, many jurisdictions have moved towards marking every legal crosswalk by default. This can help convey the potential presence of pedestrians to drivers maneuvering through the intersection. At many signalized intersections, a pedestrian crossing may have been prohibited. Often this decision was made to enhance traffic operations by eliminating the vehicle/pedestrian conflict and/or eliminating the required pedestrian crossing time from a signal phase. The decision to prohibit a crossing at a signalized intersection often requires pedestrians to detour across several other legs to cross the street, which can increase their exposure to crash risk and significantly delay their travel. As part of a crosswalk policy, an agency should consider whether these past decisions to exclude crosswalks should be revisited and whether crosswalks across all legs of a signalized intersection should be marked by default.

What Crosswalk Markings Should Be Used?

Like uncontrolled crosswalks, the same marking standards are available in the MUTCD to use at controlled crossings. The crosswalk policy should identify the agency's preferred marking treatment at controlled locations, including crosswalks across side streets controlled by stop signs. Advance stop lines can help to improve the visibility of pedestrians on multiple lane approaches. State-specific school zone crosswalk marking requirements often apply to controlled crosswalks as well. These standards and agency specific school zone measures should be incorporated into a crosswalk policy as appropriate.

Controlled Crosswalk Treatment Selection Process

Are Geometric Enhancements Needed?

While controlled intersections may help to reduce conflicts between pedestrians and drivers, geometric design of these intersections can still lead to increased pedestrian exposure and promote high vehicle speeds. Therefore, geometric enhancements should be considered when reviewing controlled intersections. These may include reduced curb radii, bulb outs, median refuges, and elimination of right-turn slip lanes and free right turns.

What Signal Phasing Is Appropriate?

Historically, traffic signal phasing decisions have primarily been based on vehicle operations. A crosswalk policy is an opportunity to prioritize pedestrian movements at signalized intersections. Pedestrian signal enhancements include the following:

- Pedestrian phase recall
- Pedestrian scramble (or pedestrian only phase) with or without diagonal crossing allowed
- Leading pedestrian interval (LPI)
- Protected left-turn phasing
- No right turn on red
- Protected right-turn phasing
- Protected/permissive left-turn phasing with permissive phase only allowed when there are not pedestrians

The crosswalk policy can define when these measures should be implemented based on expected conflicts.

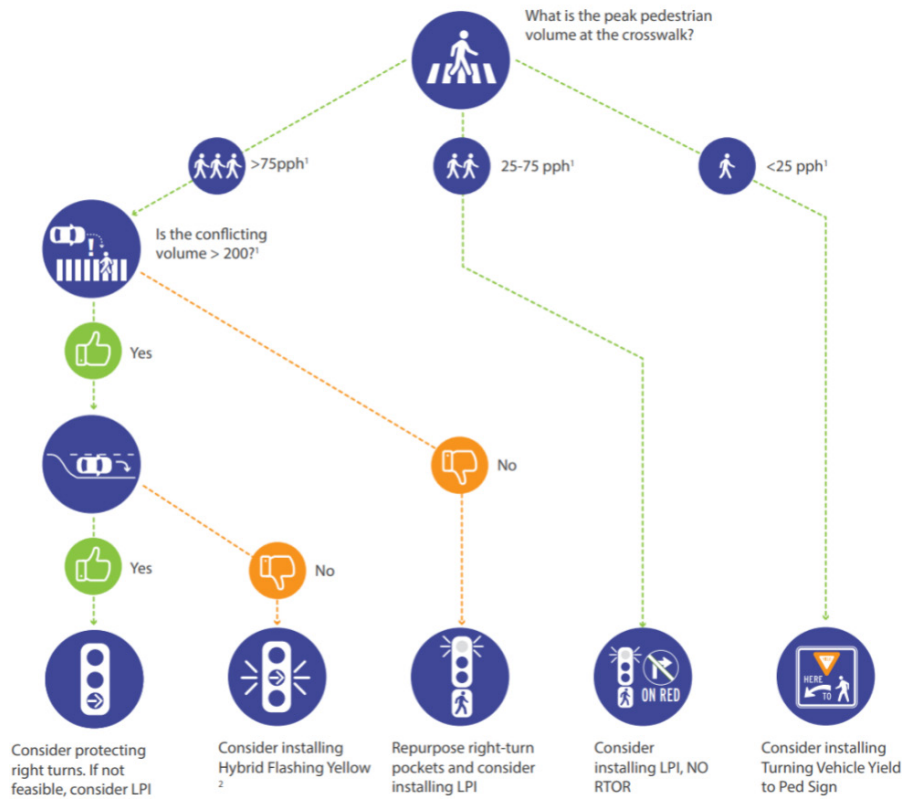


Figure 14. Example decision flow chart (one of several) for pedestrian treatments at signalized intersections, City of Pittsburgh. Source: Fehr & Peers.



Figure 15. Pedestrian scramble in Washington, DC. Source: Ryan McClain.

Implementation/Phasing Plan

Implementing a pedestrian crosswalk policy has many elements such as the following:

- Prioritization of crossings
- ADA transition plans
- Coordination with other plans – local, regional, state
- Coordination with other projects
- Land use actions/development review/transportation impact studies
- Community concerns, input, and requests
- Pilot projects, temporary and quick-build activities
- Training

Developing a Priority System for Marking Crosswalks

Crosswalks and the related traffic control devices are one category out of many assets that a community manages. A community should develop a proactive, data-informed, equitable, and thus defensible approach to prioritize where, when, and how to mark crosswalks in the community. Communities can mark priorities based on risks, needs, or a combination of both criteria. Risk-based criteria examine the vulnerability of pedestrians and pedestrian exposure, while needs criteria examines people’s transportation access and networks.

Controlled Crosswalk Treatment Selection Process

Examples of risk-based criteria include the following:

- Traffic volumes
- Traffic speed
- Crash history
- Crash severity
- Number of lanes
- Crossing distances
- Sight lines
- Pedestrians of differing abilities
- Number of pedestrians

Further, equity should be considered when prioritizing crossing locations to be evaluated and the distribution of funds for crossing improvements. Areas with higher-than-average underserved and vulnerable populations (this may include youth, seniors, low-income, non-English speaking, high-transit use/low auto ownership, and communities of color) are often left out of decisions about where crosswalks or other safety improvements could be made. In the United States, resources such as the Environmental Protection Agency's environmental

Examples of needs-based criteria include the following:

- Schools
- Accessibility
- Parks
- Transit stops
- Paths and trails
- Network connectivity
- Neighborhoods
- Commercial areas

justice screen located at <https://toolkit.climate.gov/tool/ejscreen-environmental-justice-screening-and-mapping-tool> may be used to identify these communities. Once identified, professionals can turn to authentic community engagement, as outlined in this concise Vision Zero-oriented Health Equity Roadmap from the Prevention Institute located at <https://www.preventioninstitute.org/publications/vision-zero-health-equity-road-map-getting-zero-every-community>.



Figure 16. The ADA considers barriers to access, such as curbs and steps at pedestrian crossings, a civil rights violation and discrimination. *Source: Patrick Wright, PennDOT LTAP.*

ADA Transition Plan

Title II of the Americans with Disabilities Act applies to state and local governments. Title II and the supporting federal regulations require that entities of 50 or more employees develop an ADA Transition Plan and entities of less than 50 employees develop a self-evaluation.³ The ADA Transition Plan is required to identify non-compliant pedestrian facilities and develop a program to upgrade those facilities over time. The upgrading of these ramps, sidewalks, and other facilities offers an opportunity to coordinate crosswalk markings and improvements.

Specific guidance for facilities in the public right-of-way that impact crosswalk placement and design are reflected in the draft Public Rights-of-Way Accessibility Guidelines (PROWAG), the MUTCD, and state design guidelines.

Marking a crosswalk for the first time is considered an alteration of a pedestrian path, and thus triggers ADA compliance for the ramps associated with the newly marked crosswalk. Maintenance of an existing marked crosswalk does not trigger ADA compliance.

³ <https://www.fhwa.dot.gov/federal-aidessentials/catmod.cfm?id=32>

Did You Know?

ADA requires local governments with 50 or more employees to have a specific grievance process for accessibility complaints, which could affect crosswalks, as per 28 C.F.R. § 35.107(b). You can learn more about these requirements under ADA Coordinator, Notice & Grievance Procedure section of the ADA Best Practices Tool Kit for State and Local Governments.

Below are examples of grievance systems from some public agencies fitting this criteria:

- Philadelphia, PA, USA ADA Request a Service
- St. Petersburg, FL USA See Click Fix
- Scottsdale, AZ, USA E-Services
- Seattle, WA, USA Community Crosswalk Program

Integration/Coordination with Other Plans/Policies

Communities may have a variety of other documents, plans, policies, and ordinances that could impact crosswalks and the pedestrian transportation system. Some examples could include the following:

- Regional Transportation/Mobility Plans
- Active Transportation Plans
- Complete Street Policies
- Safety Plans/Local Road Safety Audits
- Vision Zero Policies
- Community Comprehensive Plans
- Adopted Roadway Design Standards/Ordinances/Codes

When developing the crosswalk policy, a review of these other documents is vital to ensure that there is consistency among the documents, particularly for those requirements that may be binding. Also, the crosswalk policy can be a stand-alone document, or could be a subset of another document, such as an Active Transportation Plan.

Coordination with Other Projects

For many communities, the application of crosswalks and related pedestrian facilities is completed through other maintenance and design projects. Communities should take advantage of these opportunities to include pedestrian improvements in these projects, as well as ensuring that pedestrian needs are fully considered in these projects. Leveraging crosswalk enhancement projects with other infrastructure efforts can result in more cost-effective implementation.

Common opportunities generated by maintenance projects include the following:

- Roadway resurfacing activities
- Pavement marking maintenance/restriping
- Sewer, water, and other utility projects
- Curb ramp/sidewalk upgrades (ADA projects)
- Traffic signal maintenance/upgrades
- Changes in intersection traffic control schemes

Design of new roadways, intersections, and other transportation facilities also offer opportunities for pedestrian facility improvements.

Construction activity can affect existing crosswalks, either temporarily or permanently. An agency's crosswalk policy should include requirements for construction projects to relocate and/or replace any affected crosswalks and a timeframe for doing so.

Considering Crosswalk Policy in Land Use Decisions

A key aspect of implementation in a pedestrian crosswalk policy is addressing land use actions and how complementary actions can be taken to complete a pedestrian network during development review. These aspects can affect the approach to and the placement of crosswalks and should be considered holistically. This can include consideration of pedestrian needs in traffic impact analysis. Key considerations include the following:

- Fronting or frontage improvements
- Sidewalk gap infill potentially utilizing impact fees or pro-rata share districts (connecting to parks, schools, transit, commercial centers, trails)
- Crosswalk and street crossing needs

Like other agency policies, development reviewers should be familiar with an agency's crosswalk policy, including its goals and processes. Development review is a key place where agencies can incrementally take steps to advance pedestrian crossing policies. This can specifically entail the following:

- Pedestrian crossing enhancements (medians, signs, markings, RRFBs, traffic calming, ADA, lighting)
- Improvements to the pedestrian path of travel to/from crosswalks including accessibility enhancements, especially along the project frontage
- Removal of obstructions such as drainage facilities within the pedestrian crossing path
- Developing and maintaining adequate sight distance at pedestrian crossing points with streets and driveways (parking placement, pole placement, landscape placement, traffic signal equipment placement, building setback, grades, and any other sign obstructions)

Streets and roads are not exclusively on public property. Many private sites have roadways that are open to public travel. They are roadway or roadway like facilities that serve through travel on the site. Many times, these have the appearance of a public street and include the following:

- Circulation roads
- Driveway throats
- Roadways in front of buildings that connect to public streets



Figure 17. Example of low-cost curb extensions from Baltimore, Maryland.

Source: Patrick Wright, PennDOT LTAP.

Where these conditions exist for sites that have roadways open to public travel, similar criteria for pedestrian crossings should be considered. The most complex pedestrian crossing for many site roadways open to public travel is the building frontage road adjacent to building entrances. Depending upon the site trip generation, these locations can meet MUTCD yield or stop sign warrants.

Community Concerns, Input, and Requests

Most communities already have a public input process in place to handle resident concerns and requests related to services. This complaint process can be expanded to include requests for crosswalks and pedestrian safety concerns. Once the community receives a concern or request, it is critical to address it through a documented process. The process may include the following:

- A method for a resident to provide input (online form, printed form, call-in number, phone app, etc.)
- A response from the local government that the input has been received
- A procedure to assess the validity of the input, including study requirements and schedule
- A formal response back to the resident

Pilot Projects, Temporary, and Quick Build Activities

There are several physical improvements related to crosswalks—such as curb extensions, raised crosswalks, speed humps/cushions, and others—that can be installed using temporary materials. The temporary materials can include traffic paint, tubular markers, flexible curbing, and temporary traffic calming devices. The installation of temporary devices can be a method to realize safety benefits in the short term until funding can be obtained to install permanent facilities.

Temporary installations must still conform to national and state design criteria for the treatment. This includes the placement, spacing, color, size, and shape of the devices.

The City of San Francisco Vision Zero Safe Streets 2018 Year-end Program Evaluation showed that temporary measures were effective in reducing the speed of turning vehicles, increasing motorist yield rates, and creating more pedestrian safe space away from turning vehicles. (<https://www.sfmta.com/vision-zero-quick-build-projects>)



Figure 18. Temporary roundabout and curb extensions in Lancaster, PA.

Source: Patrick Wright, PennDOT LTAP.

Testing Concepts for Community Acceptance

Some communities may be initially resistant to some crosswalk treatments and related traffic calming devices. Temporary installations, demonstration, or “pilot” projects afford an opportunity for all members of a community to try, test, and evaluate these features without the expense of permanent construction. Framing these installations as temporary may be important for public works staff with maintenance and snow removal concerns, emergency responders concerned with delays to response times, police departments concerned with safety and driver behavior, as well as the concerns of different road users.

Training

There are many resources for training and education on crosswalks for staff, from road crew to engineers to public officials.

For road crew and public works officials, the FHWA Local and Tribal Technical Assistance Program offers training and

technical assistance services. There is training on applying pavement marking materials, maintaining pavement markings, studying crosswalks, and setting up proper temporary traffic control. The support center can be found at NLTAPA.org.

Public works staff and engineers can find a wide variety of training and education materials from many sources, including national, state, and professional organizations. At the national level, the Pedestrian and Bicycle Information Center, the National Highway Institute at FHWA, and others offer many on-demand and in-person training sessions on crosswalks. Most state departments of transportation also offer training on an array of topics. Professional organizations such as ITE also offer training and education sessions.

Many of the above sources have refined materials that are appropriate for the education of public officials and the general public. In addition, most state DOTs have education information on pedestrian safety tips and using crosswalks.

The safety, accessibility, and mobility of pedestrians are at the core of why agencies seek to create a crosswalk policy. This guide has explored the process of creating a successful policy and what common elements a policy should include.

Developing a crosswalk policy based on the guiding principles of following best practices, applying treatments consistently and uniformly, and prioritizing improvements in a deliberate and equitable manner will result in a crosswalk policy that will be a key tool to improving pedestrian safety throughout jurisdictions. Engaging stakeholders during policy development will help to ensure buy-in from the community and elected officials. The policy will provide an agency with

the tools needed to systematically address existing crosswalk upgrades, respond to community requests, and proactively implement crosswalks where needed in an equitable way.

Resources for further consideration, including design guidance, are included in Appendix A along with sample policies from throughout the United States in Appendix B. The future potential adoption of the Draft Public Rights-of-Way Accessibility Guidelines (PROWAG) as well as the ongoing updates to the MUTCD should be considered during the planning of future crosswalk policies and implementation of all crossing facilities.

***Accessible Public Rights-of-Way Planning and Design for Alternations*, U.S. Access Board, 2007, <https://www.access-board.gov/prowag/planning-and-design-for-alternations/>**

This report and its recommendations are the work of a subcommittee of the Public Rights-of-Way Access Advisory Committee (PROWAAC) and are intended to provide technical assistance only. The report is not a rule and has no legal effect and includes several case study examples for challenging real-life conditions, as well as responses to Frequently Asked Questions.

Design and Safety of Pedestrian Facilities: A Recommended Practice of the Institute of Transportation Engineers. Committee TENC-5A-5, Chair, Charles V. Zegeer, March 1998, https://safety.fhwa.dot.gov/ped_bike/docs/designsafety.pdf

This publication provides several recommended practices for pedestrian facility design and operation including the following: road crossings, sidewalks and paths, pedestrian and motorist signing, crosswalks and stop lines, signalization, neighborhood traffic calming, transit stops, and accommodating pedestrians in work zones, among others.

***Designing Sidewalks and Trails for Access. Part II of II: Best Practices Guide*, FHWA, 2001, https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/sidewalk2/**

This guide was created to provide planners, designers, and transportation engineers with a better understanding of how sidewalks and trails should be developed to promote pedestrian access for all users, including people with disabilities. The information in the guidebook is meant to be used as guidance only and should not be construed as requirements or regulations. The Guide has been divided into four sections: (1) understanding the user, (2) sidewalk development, (3) trail development, and (4) appendices.

Designing Walkable Urban Thoroughfares: A Context Sensitive Approach, An ITE Recommended Practice, produced by ITE and the Congress for New Urbanism, 2010, <https://www.ite.org/pub/?id=E1CFF43C-2354-D714-51D9-D82B39D4DBAD>

This report was developed in response to widespread interest for improving both mobility choices and community character through a commitment to creating and enhancing walkable communities. Many agencies will work toward these goals using the concepts and principles in this report to ensure the users, community, and other key factors are considered in the planning and design processes used to develop walkable urban thoroughfares. This report contains a chapter on Intersection Design Guidelines and guidance on midblock crossings.

FHWA Toolbox of Countermeasures and Their Potential Effectiveness https://safety.fhwa.dot.gov/ped_bike/tools/solve/fhwasa18041/

This toolbox is a resource that provides various pedestrian countermeasures, the Crash Modification Factors (CMFs) for various crash types, and star ratings for each CMF estimate. A CMF is the proportion of crashes that are expected to remain after the countermeasure is implemented. If the CMF is negative, the implementation of a countermeasure is expected to lead to a percentage increase in crashes. One CMF estimate is provided for each countermeasure in the tables. Where multiple CMF estimates were available from the literature, selection criteria were used to choose which CMFs to include in the issue brief. The “Star Rating” is an indication of the quality or confidence of the CMF and is based on the following factors: study design, sample size, standard error, potential bias, and data source. The ratings range from 1 to 5, where 5 indicates the highest or most reliable rating. The CMFs are updated periodically. (The last update shown in the FHWA webpage is October 16, 2018).

***Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations*, FHWA, July 2018, https://safety.fhwa.dot.gov/ped_bike/step/docs/STEP_Guide_for_Improving_Ped_Safety_at_Unsig_Loc_3-2018_07_17-508compliant.pdf**

This guide assists state and local transportation or traffic safety officials in developing a policy or guide for the installation of countermeasures at uncontrolled pedestrian crossing locations. This document provides guidance to agencies, including best practices for each step involved in selecting countermeasures. The Guide was developed to address a significant national safety problem and improve quality of life for pedestrians of all ages and abilities. Agencies may use this guide to develop a customized policy or to supplement existing local decision-making guidelines. The January 2018 version of this guide was updated to include the Rectangular Rapid-Flashing Beacon (RRFB) in response to the FHWA issuing Interim Approval (IA-21) for the optional use of RRFBs in March 2018. Also included is a countermeasure selection matrix that is based on posted speed limit, traffic volume ranges, and roadway width/presence of a raised pedestrian median island, as well as a matrix showing the type of safety issue each pedestrian countermeasure is intended to address.

Guide for Maintaining Pedestrian Facilities for Enhanced Safety, FHWA, 2013, https://safety.fhwa.dot.gov/ped_bike/tools_solve/fhwasa13037/

This document provides guidance for maintaining pedestrian facilities with the primary goal of increasing safety and mobility. The guide addresses the needs for pedestrian facility maintenance, common maintenance issues, inspection, accessibility, and compliance; maintenance measurers, funding, and construction techniques to reduce future maintenance. The guide identifies effective and exceptional practices, along with barriers for pedestrian facility maintenance; what works and what does not work based on experience from state and local agencies. Exemplary and effective practices for maintaining pedestrian facilities and infrastructure are also provided.

Guide for the Planning, Design and Operation of Pedestrian Facilities, 1st Edition, AASHTO, 2004,

This guide provides guidance on the planning, design, and operation of pedestrian facilities along streets and highways. Specifically focuses on identifying effective measures for accommodating pedestrians in the public right of way and includes existing and proposed facilities. Where street crossings are greater than 60 feet, a crossing island should be considered. Provides good ADA guidance. This edition was published before the 2009 MUTCD and the adoption of the PHB as well as the Interim Approval for the RRFB (IA-21) and other innovative pedestrian traffic control devices or applications. This Guide supplements AASHTO's Policy on Geometric Design of Streets and Highways (Green Book). The second edition of the AASHTO Guide for the Planning, Design, and Operation Facilities was released in December 2021.

How to Develop a Pedestrian Safety Action Plan, FHWA, March 2009, https://safety.fhwa.dot.gov/ped_bike/ped_focus/docs/fhwasa0512.pdf

This guide presents an overview and framework for state and local agencies to develop and implement a Pedestrian Safety Action Plan (PSAP) tailored to their specific problems and needs. A PSAP is a plan developed by community stakeholders intended to improve pedestrian safety in the community. An objective of the guide is to help state and local officials know where to begin to address pedestrian safety issues. It is also intended to assist agencies in further enhancing their existing pedestrian safety programs and activities, including identifying safety problems and selecting optimal solutions. This guide is primarily a reference for improving pedestrian safety through street redesign and the use of engineering countermeasures as well as other safety-related treatments and programs that involve the whole community.

ITE Traffic Control Devices Handbook, 2nd Edition, 2013. Editor, Robert K. Seyfried

The Traffic Control Devices Handbook was developed as a supplement to the MUTCD but does not have the legal authority of the MUTCD or various state supplements. The Handbook offers needed information to assist a person unfamiliar with the MUTCD to make the right decisions regarding placing the appropriate devices in the correct locations to satisfy the needs of road users and to promote uniformity. Includes chapters on Traffic Control for School Areas (Chapter 12), and Pedestrians (Chapter 13). Pedestrians chapter provides good guidance on pedestrian crash countermeasures and street crossing treatments. Pedestrian traffic control guidance also contained in other chapters (e.g., Chapter 10 on Traffic Signals).

2009 Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), FHWA, <https://mutcd.fhwa.dot.gov/>

The MUTCD defines the standards used by road managers nationwide to install and maintain traffic control devices (TCDs) on all public streets, highways, bikeways, and private roads open to public travel. The MUTCD is published by the Federal Highway Administration (FHWA) under 23 Code of Federal Regulations (CFR), Part 655, Subpart F. All states are required to adopt the federal manual, the manual with a state supplement, or a state manual that is in substantial conformance to the federal MUTCD within 2 years of publication. The MUTCD provides standards, guidance, options, and support regarding the design and application of TCDs, consisting of signs, traffic signals, and pavement markings, including temporary traffic control. The FHWA is developing an NPA for a new edition of the MUTCD that is expected to be issued shortly, but the rulemaking process may take up to 24 months. Several Interim Improvements have been issued by the FHWA since the 2009 MUTCD including IA-21 for the optional use of RRFBs: https://mutcd.fhwa.dot.gov/res-interim_approvals.htm. The FHWA website also includes links to Official Rulings, Official Interpretations by the FHWA, approved Experiments, and responses to Frequently Asked Questions (FAQs).

NCHRP Synthesis 498: Application of Pedestrian Crossing Treatments for Streets and Highways, TRB, A Synthesis of Highway Practice, 2016, <http://www.trb.org/Publications/Blurbs/175419.aspx>

This synthesis summarizes the types of pedestrian crossing treatments being used throughout the United States, and what policies and processes are used to select and prioritize treatments and treatment locations and does not produce new guidance. The study was developed by: (1) surveying state departments of transportation and local transportation agencies, (2) identifying and synthesizing effective practices and policies, and (3) performing a comprehensive literature review of safety evidence for more than 25 pedestrian crossing treatments. Case examples highlight more comprehensive pedestrian safety practices.

NCHRP Research Report 562/TCRP Report 112: *Improving Pedestrian Safety at Unsignalized Crossings*, 2006, <http://www.trb.org/Publications/Blurbs/157723.aspx>

This document examines selected engineering treatments to improve safety for pedestrians crossing high-volume and high-speed roadways at unsignalized locations. The report presents the edited final report and Appendix A. TCRP Web-Only Document 30/NCHRP Web-Only Document 91 (Pedestrian Safety at Unsignalized Crossings: Appendices B to O) contains the remaining appendixes of the contractor's final report. The research team developed guidelines that can be used to select pedestrian crossing treatments for unsignalized intersections and midblock locations (Guidelines for Pedestrian Crossing Treatments). Quantitative procedures in the guidelines use key input variables (such as pedestrian volume, street crossing width, and traffic volume) to recommend one of four possible crossing treatment categories. The research team developed and presented recommendations to revise the MUTCD pedestrian traffic signal warrant to the National Committee on Uniform Traffic Control Devices (NCUTCD).

NCHRP Research Report 893: *Systemic Pedestrian Safety Analysis*, TRB, 2018, <http://www.trb.org/NCHRP/Blurbs/178087.aspx>

This research develops a systematic pedestrian safety analysis method for state and local agencies. The safety analysis method can be used to proactively identify sites for potential safety improvements based on specific risk factors for pedestrians. A systematic approach, as opposed to a hot-spot approach, enables transportation agencies to identify, prioritize, and select appropriate countermeasures for locations with a high risk of pedestrian-related crashes, even when crash occurrence data are sparse. The report also provides important insights for the improvement of data collection and data management to better support systemic safety analyses. The report is a practitioner-ready resource to implement the research results with step-by-step guidance on how to conduct a systemic pedestrian safety analysis, along with four case studies highlighting early applications of systemic approaches to pedestrian safety analysis.

NCHRP Research Report 926: *Guidance to Improve Pedestrian and Bicyclist Safety at Intersections*, TRB, 2020, <http://www.trb.org/Main/Blurbs/180624.aspx>

This report provides a succinct process for selecting intersection designs and operational treatments that provide safety benefits for pedestrians and bicyclists, and the most appropriate situation for their application. The report provides a step-by-step process for selecting intersection safety treatments based on site conditions, effectiveness, level of public process, and their potential to reduce certain common pedestrian and bicycle crash types. The appendix is a countermeasure glossary documenting 34 pedestrian and bicycle intersection safety countermeasures with two-page listings of key information for each.

Ped Bike Data, National and Bicycle Safety Data Clearinghouse, Collaborative Sciences Center for Road Safety (CSCRS), PBIC, FHWA, <http://www.pedbikedata.org/>
The purpose of the CSCRS National Pedestrian and Bicycle Safety Data Clearinghouse is to help connect researchers to the data they need to conduct robust studies of pedestrian and bicyclist safety. The goal is to greatly increase the quality and quantity of pedestrian and bicyclist safety research in the United States. Data exists for crashes, pedestrian, bicyclist, and motor vehicle counts and for various types of infrastructure. CSCRS does not maintain the links in these databases. In some cases, information may be out of date.

PEDSAFE Tool: Pedestrian Safety Guide and Countermeasure Selection System, FHWA, <http://www.pedbikesafe.org/pedsafe/>

The Pedestrian Safety Guide and Countermeasure Selection System provides practitioners with the latest information available for improving the safety and mobility of those who walk. This is an online tool that provides users with a list of possible engineering, education, or enforcement treatments to improve pedestrian safety and/or mobility based on user input for a specific location. The online tool also contains case studies, resources, and guidelines.

***Pedestrian and Bicyclist Road Safety (RSA) Audit Guide and Prompt List*, FHWA, September 2020,** https://safety.fhwa.dot.gov/ped_bike/tools_solve/docs/fhwasa20042.pdf

This guide is intended to support agencies that are interested in conducting pedestrian- and bicycle-focused RSAs and includes information on safety risks for both modes, the RSA process, necessary data, and the roles and responsibilities of the RSA Team. Also included are updated prompt lists for pedestrians and bicyclists to use in the field. This guide will aid practitioners in understanding pedestrian and bicyclist issues in their jurisdiction and potentially achieve other goals in addition to safety, such as enhancing quality of life, improving community health, or increasing pedestrian and bicycle mode share.

***Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way, U.S. Access Board*, 2011,** <https://www.access-board.gov/prowag/>

Proposed accessibility guidelines from the Architectural and Transportation Barriers Compliance Board for the design, construction, and alteration of pedestrian facilities in the public right-of-way (PROWAG). The proposed guidelines ensure that sidewalks, pedestrian street crossings, pedestrian signals, and other facilities for pedestrian circulation and use constructed or altered in the public right-of-way by state and local governments are readily accessible to and usable by pedestrians with disabilities. This is a proposed guideline that has not been finalized by the U.S. Access Board but is a helpful resource in proposed form.

Safe Routes to School Briefing Sheets, School Traffic Control, ITE, September 20, 2012, <https://www.ite.org/pub/?id=E2660E01-2354-D714-51EB-F2E399C901F9>

This is one of a series of briefing sheets providing a hands-on reference for transportation professionals initiating or engaged in implementing safe routes to school (SRTS). The briefing sheets will aid practitioners in addressing infrastructure changes and in implementing plan components as part of a SRTS team.

Safe Transportation for Every Pedestrian (STEP), FHWA, 2020, https://safety.fhwa.dot.gov/ped_bike/step/

Through the Every Day Counts STEP initiative, FHWA is promoting the following countermeasures to improve pedestrian crossing locations and reduce crashes: road diets, pedestrian hybrid beacons (PHBs), pedestrian refuge islands, raised crosswalks, crosswalk visibility enhancements, rectangular rapid flashing beacons (RRFBs), and leading pedestrian intervals (LPI). The purpose of this program is to improve safety, target safety investment resources, and to enhance the quality of life. The FHWA webpage provides links to related webinars, resources, videos, and STEP UP campaign information. (Webpage last updated June 9, 2021.) In August 2020, FHWA launched the STEP Studio, which is a comprehensive compilation of resources, design guidance, research, and best practices for practitioners to identify appropriate countermeasures for improved pedestrian safety to enhance the STEP program. https://safety.fhwa.dot.gov/ped_bike/step/resources/docs/step_studio.pdf

Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations: Final Report and Recommended Guidelines, FHWA, Charles V. Zegeer, 2005, <https://www.fhwa.dot.gov/publications/research/safety/04100/04100.pdf>

The purpose of this study is to determine whether marked crosswalks at uncontrolled locations are safer than unmarked crosswalks under various traffic and roadway conditions. Another objective is to provide recommendations on safer crossings for pedestrians. This study involved an analysis of 5 years of pedestrian crashes at 1,000 marked crosswalks and 1,000 matched unmarked comparison sites. All sites in this study had no traffic signal or STOP sign on the approaches. The study results revealed that on two-lane roads, the presence of a marked crosswalk alone at an uncontrolled location was associated with no difference in pedestrian crash rate, compared to an unmarked crosswalk. On multilane roads with traffic volumes above about 12,000 vehicles per day, having a marked crosswalk alone (without other substantial improvements) was associated with a higher pedestrian crash rate compared to an unmarked crosswalk. Raised medians provided significantly lower pedestrian crash rates on multilane roads, compared to roads with no raised median. Older pedestrians had crash rates that were high, relative to their crossing exposure.

School Site Planning, Design, and Transportation, ITE Technical Committee TENC 105-01, 2013

This report highlights desirable practices in school planning, design, and operation that can be applied during all stages of planning new schools or redeveloping existing school sites. This report focuses primarily on conventional public schools, particularly elementary and middle schools (grades K–8), but also addresses high schools, charter schools, and magnet schools that draw students from a wider attendance area. A major emphasis will be on the design of new schools for maximum walkability, safety, and efficiency, but this report addresses these issues during the redevelopment of existing school sites as well. The report summarizes transportation issues for consideration by policymakers, professionals, and school administrators during school planning, design, and operations, including school crossing considerations and applications.

“To Cross or Not to Cross: Determining the Distance Between Crosswalks.” Mike King. Pgs. 42-47. ITE Journal, November 2014,

https://umjp9n8g2j2ft5j5637up17u-wpengine.netdna-ssl.com/wp-content/uploads/2014/11/ITEJ_Nov2014_Crosswalk_King.pdf

This article explores some of the salient points of how, when, and where a pedestrian crosses the street, and concludes that crossing points should be more frequent than what current guidance describes. Desire lines are the key to understanding pedestrian crossing points.

Urban Street Design Guide, National Association of City Transportation Officials (NACTO)

<https://nacto.org/publication/urban-street-design-guide/>

NACTO was established by practicing city transportation professionals. NACTO’s mission is to build cities as places for people, with safe, sustainable, accessible, and equitable transportation choices that support a strong economy and vibrant quality of life. The NACTO Guide unveils a toolbox and tactics cities use to make streets safer, more livable, and more economically vibrant, and is a blueprint for designing 21st century streets. The Guide outlines both a clear vision for Complete Streets and a basic road map for how to bring them to fruition. Sections on Crossings, Signalization Principles, and Midblock Crossings may be particularly helpful in developing local pedestrian crossing policies.

Yielding Laws and Enforcement, Pedestrian and Bicycle Information Center

<http://www.pedbikeinfo.org/topics/yieldinglaws.cfm>

The Pedestrian and Bicycle Information Center includes many great resources for pedestrian safety. This section focuses on education and enforcement efforts around pedestrian crossing and yielding laws.

Seattle Pedestrian Master Plan 5-Year Implementation Plan and Progress Report

https://www.seattle.gov/Documents/Departments/SDOT/PedestrianProgram/SPAB/Documents/2020_2024_PMP_ImplemPlan_v8_Main_Report_Opt.pdf

The Seattle Department of Transportation published the Seattle Pedestrian Master Plan 5-Year Implementation Plan and Progress Report in 2019. This Report serves as a helpful example of prioritization and scoring countermeasures when evaluating investments for pedestrian improvements. This plan includes policy related to crossing counter measure selection, as well as a robust sidewalk repair prioritization framework with samples of common issues.

City of Austin Pedestrian Safety Action Plan

https://www.austintexas.gov/sites/default/files/files/Transportation/Pedestrian_Safety_Action_Plan_1-11-18.pdf

The City of Austin's Pedestrian Safety Action Plan does an effective job of outlining specific action items for consideration with respect to engineering, education, enforcement, policy and land use, evaluation, and funding considerations. These considerations and action items can easily be adapted for other agencies seeking to establish an effective policy with specific action items.

City of Philadelphia Pedestrian and Bicycle Plan

https://www.phila.gov/media/20190516105402/Pedestrian_Bicycle_Plan_2012.pdf

The City of Philadelphia's Pedestrian and Bicycle Plan includes a policy that includes a detailed list with descriptions of intersection considerations that affect pedestrian travel. Coupled with sample pedestrian crash mapping, this policy provides a clear way to review and identify shortcomings in a network.

City of Pittsburg, CA Crosswalk Policy

<http://www.ci.pittsburg.ca.us/Modules/ShowDocument.aspx?documentid=12345>

The City of Pittsburg's Active Transportation Plan includes a crosswalk policy which includes detailed flow charts comparing proactive vs. reactive approaches on whether to mark uncontrolled crosswalks and midblock crosswalks.

The Florida Department of Transportation Traffic Engineering Manual

<https://www.fdot.gov/traffic/trafficservices/studies/tem/tem.shtm>

The FDOT Traffic Engineering Manual includes a chapter on Treatments for Pedestrian Crosswalks at Midblock and Unsignalized Intersections. One resource within this guidance is a graph related to the selection of pedestrian treatments on low-speed roadways when considering signal, PHB vs. RRFB.

Lincoln, Nebraska School Zone Standards

<https://www.lincoln.ne.gov/files/sharedassets/public/ltu/transportation/traffic-engineering/school-zone-standards/school-zone-standards-complete.pdf> and <https://lincoln.ne.gov/city/ltu/engine/traffic/school-zone-standards/>

City of Lincoln Nebraska offers school zone standards that includes designations, speed reduction standards, and crosswalk standards for various control types within school zones.

City of Portland Pedestrian Plan

<https://www.portlandoregon.gov/transportation/72504>

Portland's Citywide Pedestrian Plan (PedPDX) was adopted in June 2019. It contains mission, goals, objectives, the state of walking in Portland, priority network, implementation toolbox, strategies, and actions.

Washington County (Oregon) Bicycle and Pedestrian Improvement Prioritization Project

<https://www.co.washington.or.us/LUT/Divisions/LongRangePlanning/PlanningPrograms/TransportationPlanning/bikeandped/index.cfm>

The Bicycle and Pedestrian Improvement Prioritization Project takes a different approach to pedestrian policy in its focus upon prioritizing needs. It includes inventory mapping, evaluation criteria, suitability mapping and gap prioritization.

Oregon Department of Transportation (ODOT) Bicycle and Pedestrian Plan

https://safety.fhwa.dot.gov/ped_bike/docs/orbplan.pdf?q=oregon-bicycle-and-pedestrian-plan

The Oregon Bicycle and Pedestrian Plan serves as a good road map for organizing a pedestrian policy. While created in 1995, it stands as a legacy document in pedestrian policy. ODOT chose to combine pedestrians and bicycles. Their framework includes the following:

- Vision
- State & Federal Laws
- Goal, Policies, Actions
- Implementation
- Planning, Design, Maintenance, and Safety Considerations

Washington State Department of Transportation Pedestrian Facilities Guidebook

<https://safety.fhwa.dot.gov/saferjourney1/library/pdf/pedfacguide.pdf>

WSDOT's *Pedestrian Facilities Guidebook* is another legacy (1997) pedestrian policy document. This guidebook focuses its attention on design guidelines, accessibility, school zones, trails, sidewalks, intersections, crossings, traffic calming, access to transit, site design, and safety within work zones for pedestrians.

Washington State Department of Transportation (WSDOT) Design Manual, Chapter 1510 Pedestrian Facilities

<https://wsdot.com/publications/manuals/fulltext/M22-01/1510.pdf>

Recently, WSDOT adopted its Pedestrian Facilities chapter of its design manual (September 2020). This provides definitions, policy, ADA background, pedestrian facility designs and work zone accommodation.

Concord, MA Crosswalk Policy and Design Guide

<https://www.concordma.gov/DocumentCenter/View/244/Crosswalk-Policy-PDF>

In 2014, the City of Concord adopted the *Crosswalk Policy and Design Guide* which provides a detailed flow chart and process description for evaluating the need for, and implementation steps of a crossing. A sample Crosswalk Request form and specific signage and striping details are provided.

Minnesota Department of Transportation (MNDOT) Pedestrian Resources

<https://www.dot.state.mn.us/research/reports/2020/2020RIC01.pdf>

MNDOT has conducted extensive research into pedestrian issues and policies on pedestrians. Its website highlights all the key aspects of a pedestrian policy outlined in this document, which was finalized in May 2020. In addition, MNDOT features a dedicated website to Walking in Minnesota, which includes safety education, planning, research, design, and engineering as well as grants and funding.

<https://www.dot.state.mn.us/peds/>

City of Hastings, MN Policy on the Installation of Pedestrian Crosswalks

<https://www.hastingsmn.gov/home/showdocument?id=5841#:~:text=Crossing%20between%20intersections.,all%20vehicles%20upon%20the%20roadway>

City of Hastings, a mid-sized city in Dakota County, adopted the Policy on the Installation of Pedestrian Crosswalks in June 2017, which ties together the state statute, definitions, and specific criteria for marking crosswalks in Hastings.

City of Boulder, CO Pedestrian Crossing Treatment Installation Guidelines

[Pedestrian Crossings | City of Boulder \(bouldercolorado.gov\)](https://www.bouldercolorado.gov/pedestrian-crossings)

In 2011, the City of Boulder finalized installation guidelines, which include several supplemental policies in addition to evaluation considerations and candidate location treatments.

City of Springfield, MO Pedestrian Safety Study

<https://www.springfieldmo.gov/3519/Pedestrian-Safety---SGF-Yields>

<https://www.springfieldmo.gov/3592/Street-Intersection-Pedestrian-Safety-St>

In 2017, the city code was updated which identified where and when pedestrians can cross a street with a speed limit greater than 30mph. Educational components include SGF Yields and local news PSAs.

City of Raleigh, NC Comprehensive Pedestrian Plan

<https://raleighnc.gov/walk-raleigh#paragraph--230356>

The Pedestrian Plan provides strategies for enhancing Raleigh's transportation system to promote walkability throughout the City.

City of Virginia Beach Pedestrian Crossing Accommodations

http://www.virginiadot.org/business/resources/IIM/TE-384_Ped_Xing_Accommodations_Unsignalized_Locs.pdf

The City of Virginia Beach follows Virginia Department of Transportation Guidelines for crosswalks at unsignalized intersections, which was officially formalized with the release of Traffic Engineering Memorandum TE-384 in July 2016.